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THE GENTIAN OF THE TIDAL SHORES OF THE ST. LAWRENCE.

M. L. FERNALD.

(Plate 139.)

IN describing *Gentiana ciliata* of the European mountains, a characteristic species of the Alps with linear-lanceolate leaves and large blue corollas with ciliate lobes, Linnaeus gave the range: "*Habitat in Helvetiae, Italiae, Canadae montibus.*"¹ The description and references indicate clearly the European plant, so that there has never been any doubt regarding the true identity of *G. ciliata*; but no Fringed Gentian has ever been known from the "mountains of Canada" [of Linnaeus's time, *i. e.* presumably Quebec]. Consequently, there has been doubt as to what Canadian plant Linnaeus saw which could have been confused with the European *G. ciliata*, described "*angustifolia*" and "*corollis quadrifidis margine ciliatis.*" The New Englander naturally thinks of *G. crinita* but that species has the upper leaves ovate or ovate-lanceolate and broadly rounded or subcordate at base and Linnaeus would hardly have identified it with the narrow-leaved *G. ciliata*. Furthermore, in his herbarium, as shown by memoranda made at various times by Asa Gray, Linnaeus had *G. crinita* set apart as a distinct species though under an unpublished name.

In 1860 the late Dr. Charles Pickering collected at Quebec a gentian which was identified by Dr. Gray in the *Synoptical Flora* as *G. serrata* Gunn., a Scandinavian plant which it somewhat suggests, and to which Gray referred a large number of American plants now

¹ L. Sp. Pl. ed. 2: 334 (1762).

recognized as wholly distinct American species,—*G. nesophila* Holm of western Newfoundland, Anticosti and the Mingan Islands; *G. procera* Holm, a large-flowered plant extending from Manitoba eastward to Niagara County, New York; *G. Macounii* Holm, of the Canadian prairies eastward to James Bay; and other endemic and very characteristic species occurring from the Rocky Mountains to the Sierra Nevada. The Pickering specimen preserved in the Gray Herbarium is a dwarf and hardly recognizable individual, but in various details it is clearly not the Norwegian *G. serrata* but belongs in the American series of species already ably monographed by Dr. Theodor Holm,¹ who has clearly pointed out many characters separating the group of American plants from the European. For want of a better place to put it the Pickering specimen had recently been tentatively placed by the present writer with the Anticosti and Newfoundland *G. nesophila*; and in 1916 Brother Marie-Victorin distributed as *G. nesophila* from L'Islet, about forty miles east of Quebec, fruiting and somewhat fragmentary specimens which clearly belong with the Pickering plant but like it are not satisfactorily identified with the Anticosti and Newfoundland material. And finally, thanks to the intensive botanizing of Brothers Victorin and Rolland, a beautiful series of the plant is at hand from both above and below the city of Quebec. These new collections, showing abundant specimens in flower and fruit and in all sizes from small and simple individuals to large freely branching plants, at once demonstrate that the plant from the neighborhood of Quebec is a thoroughly distinct and hitherto unrecognized species with affinities about midway between *G. Macounii*, *procera*, *nesophila* and *crinita*. This species, with which it is a keen pleasure to associate the name of the untiring investigator of the flora of the Province of Quebec who has brought together the first adequate representation of the plant, is apparently typical of the tidal shores of the St. Lawrence for about fifty miles, from Cap Rouge to L'Islet. This species is illustrated in Plate 139, kindly prepared by Miss Amelia Brackett of Radcliffe College. Brother Victorin states that it "is the only common Gentian in the neighborhood of the city of Quebec. It is distinctly a riparian species, growing on the tidal shores, often within the reach of high tides. I have found it plentifully everywhere I went on the shores. It is interesting to note that neither you nor I ever found it from

¹ Ottawa Nat. xv. 176-183 (1901).

Rivière-du-Loup eastward." But, since the tide extends with considerable strength to the outlet of Lake St. Peter, it is probable that its western limit is well beyond Cap Rouge. It may also have a more extended eastern range, but in several seasons at Rivière-du-Loup and at Bic the present writer has never met the plant.

The great interest of the new species, in connection with the European *G. ciliata*, lies in the fact that the small and unbranched specimens of Brother Victorin's material laid upon sheets of *G. ciliata* are quite indistinguishable from it until the technical details are examined. The technical differences are numerous: *G. ciliata* being a perennial with creeping rhizomes, the Quebec plant annual or biennial; and *G. ciliata* having the calyx less deeply cleft and the corolla-lobes strongly fimbriate on the lower margins, the Quebec plant having the lobes with only short marginal teeth. The superficial resemblance of the two is so striking, however, that it would seem as if we at last know what plant of Canada led Linnaeus to cite his *G. ciliata* from "Helvetiae, Italiae, Canadae montibus." In August, 1749, Pehr Kalm botanized extensively about Quebec,—from Trois Rivières on the west to Les Eboulement on the east, thus covering the whole range of the gentian of the tidal shores. It seems wholly probable, in fact almost inevitable, that this pupil of Linnaeus should have found the gentian, which flowers in August, and that Linnaeus, identifying it with the plant of the mountains of Switzerland and Italy assigned it a mountain habitat in Canada as well.

This endemic plant of the St. Lawrence should be called:

GENTIANA (CROSSOPETALAE) **Victorinii**, n. sp. Biennis; caule simplici vel cum ramis valde ascendentibus instructo 3–4 dm. alto glabro 4-angulato; foliis imis rosulatis spathulatis brevibus, mediis superioribusque 4–9-jugis lineari-lanceolatis acutis vel acutiusculis paulo carnosius 2–5.5 cm. longis 2–6 mm. latis; pedunculis 2–9 cm. longis; calycibus herbaceis inequaliter ad mediam 4-lobatis, lobis apice subulato-acuminatis longioribus lanceolatis 0.6–1.5 cm. longis, brevioribus ovatis 0.45–1.2 cm. longis, carinis glabris vel vix granulosis; corollis azureis 2–4 cm. longis ad mediam partem 4-lobatis, lobis oblongo-obovatis obscure venosis valde ascendentibus apice rotundato interdum etiam marginibus dentatis vel lacerato-fimbriatis; filamentis alatis eciliatis; ovario stipitato, stipite circa 5 mm. longo, stylo circa 2 mm. longo; capsula corolla brevior subsessile; seminibus valde papillosis.

Biennial: stem simple or with strongly ascending branches, 1–4 dm. high, glabrous, 4-angled: leaves 4–9 pairs below the primary peduncle; the lower spatulate; the middle and upper linear-lanceolate,

acute or acutish, somewhat fleshy, the median 2-5.5 cm. long, 2-6 mm. wide; peduncles 2-9 cm. long; calyx herbaceous, unequally cleft to about the middle, 4-lobed; the lobes all subulate-acuminate at tip; the longer lanceolate, 0.6-1.5 cm. long; the shorter ovate, 0.45-1.2 cm. long; the keels glabrous or only obscurely granulose: corolla deep-blue, 2-4 cm. long, cleft nearly half its length, 4-lobed; the lobes oblong-obovate, only obscurely veiny, strongly ascending, uniformly dentate to lacerate-fimbriate on summit and often on the sides: filaments winged, naked: pistil fusiform, stipitate; the stipe about 5 mm. long; style definite, about 2 mm. long; stigma subreniform: mature capsule shorter than the corolla, becoming subsessile: seed conspicuously papillose.—QUEBEC: tidal shores of the River St. Lawrence from above the city of Quebec to L'Islet. The following specimens have been studied. Cap-Rouge, près du Pont de Québec, sur le rivage à portée de la marée haute, August 9, 1922, *Fr. Rolland*, no. 16,070; Cap-Rouge, un mille plus haut que le Pont de Québec, sur le rivage à portée de la marée, August 9, 1922, *Fr. Marie-Victorin*, no. 16,073 (TYPE in Gray Herb.); Quebec, 1860, *Charles Pickering*; rivage, à portée de la marée, St.-Laurent de l'Île d'Orleans, August 6, 1922, *Marie-Victorin*, no. 17,071; rocks near the shore, L'Islet, August, 1916, *Marie-Victorin*, no. 3183.

The relationships of *G. Victorinii* and the other species of the section *Crossopetalae* in eastern America are indicated in the appended key.

- A. Upper leaves ovate to ovate-lanceolate, broadly rounded or subcordate at base: upper half of the corolla-lobes fimbriate with a uniformly long fringe 2-6 mm long: capsule distinctly stipitate *G. crinita* Froel.
(Eastern states, north to Iowa, Wisconsin, Michigan, southern and eastern Ontario, western and central New York, Rutland Co., Vermont, Grafton Co., New Hampshire and central Maine.)
- A. Upper leaves linear, linear-lanceolate, narrowly oblong or spatulate; fringe of corolla-lobes of varying lengths, often long below but of short triangular teeth (less than 2 mm. long) above; capsule sessile or stipitate B.
- B. Upper leaves linear or linear-lanceolate, acute or acutish: calyx with all 4 lobes attenuate or the 2 broader at least acute C.
- C. Elongate leaves (above the basal rosette) 8-13 pairs below the primary peduncle: calyx-lobes with strongly papillose-scabrous keels; the longer lobes 1-3 cm. long; corolla 2-5.5 cm. long, with spreading-ascending lobes: ovary nearly or quite sessile. *G. procera* Holm.
(Manitoba and Iowa eastward to western New York.)
- C. Elongate leaves (above the basal rosette) 3-7 (-9) pairs below the primary peduncle: calyx-lobes with smooth or only granulose keels; the longer lobes 0.5-1.5 cm. long; corolla 2-4 cm. long, with strongly ascending lobes.

Elongate leaves 4-9 pairs, linear-lanceolate, 2-6 mm. wide, ascending high on the plant: primary peduncle and its flower $1\frac{1}{5}$ - $2\frac{1}{5}$ (exceptionally $-1\frac{1}{2}$) the entire height of the plant, 5.5-13.5 cm. long: the 2 broad calyx-lobes subulate-acuminate at tip: filaments naked: ovary with stipe about 5 mm. long.....*G. Victorinii* Fernald.
(St. Lawrence River, Quebec Co. to L'Islet Co., Quebec.)

Elongate leaves 3-7 pairs, linear, 1.5-4 mm. wide, mostly confined to the lower half of the plant: primary peduncle and its flower $2\frac{2}{3}$ - $4\frac{4}{5}$ the entire height of the plant, 0.6-2.1 dm. long: the 2 broad calyx-lobes merely acute or short-acuminate: filaments ciliate near the middle: ovary subsessile or with short thick stipe.....*G. Macounii* Holm.
(Montana and Alberta east to Minnesota and Rupert House, James Bay.)

- B. Upper leaves oblong, spatulate or oblanceolate, obtuse or rounded at tip, mostly crowded at the lower third of the plant: the primary peduncle and its flower $2\frac{2}{5}$ - $9\frac{1}{10}$ the entire height of the plant: calyx with glabrous keels; its 2 broad lobes obtuse or merely subacute: corolla-lobes merely dentate, divergent: ovary sessile or subsessile.....*G. nesophila* Holm.
(Western Newfoundland and Anticosti and Mingan Islands, Quebec.)

GRAY HERBARIUM.

EXPLANATION OF PLATE 139.

Gentiana Victorinii, n. sp. Fig. 1, large plant, $\times 1/2$; fig. 2, small plant, $\times 1/2$; fig. 3, calyx laid open, $\times 1$; fig. 4, corolla laid open to show stipitate ovary and naked filaments, $\times 1$; fig. 5, fruit, $\times 1$.

NOTES ON NEW ENGLAND HEPATICAE,—XVII.¹

ALEXANDER W. EVANS.

(Continued from page 83.)

3. *BAZZANIA DENUDATA* (Torr.) Trevis. Mem. Ist. Lomb. **13**: 414. 1877. *Mastigobryum denudatum* Torr., G. L. N. Syn. Hep. 216. 1845. *Jungermannia denudata* Torr. l. c., as synonym, not Nees. *Mastigobryum ambiguum* Lindenb. (in part) op. cit. 217. 1845. On rocks, more rarely on rotten logs. Maine: Greenville, A. W. E. (listed as *B. tricrenata* by the writer, *RHODORA* **14**: 17. 1912); Round Mountain Lake, Franklin County, and Jordan Mountain, Mt. Desert, A. Lorenz. New Hampshire; base of Mt. Washington, J.

¹ Contribution from the Osborn Botanical Laboratory.

A. Allen; Flume, *James Herbarium*; Gorham and Franconia, *T. P. James*; Thompson's Falls, White Mountains, *Underwood & Cook* 19; the "Pool" and Shelburne, *W. G. Farlow*, Mt. Willard, *E. Faxon*; Mt. Prospect, Plymouth, *A. J. Grout*; Waterville, *A. Lorenz*; Ice Gulch, Randolph, and Howker's Trail, Mt. Madison, *A. W. E. Vermont*: Bolton, *A. W. E.*; Lake Dunmore, Salisbury, and Willoughby, *A. Lorenz*; Granville Notch, *C. A. Weatherby*; Downer's Glen, Manchester, *A. J. Grout*; Brandon, *D. L. Dutton* 1378, 1577. Massachusetts: Plainfield (part of the original material of *M. denudatum* from the Hooker Herbarium, now in the Mitten Herbarium); Middlefield, 1822, *Emmons* 120 (specimen in the herbarium of the New York Botanical Garden, labeled "*J. denudata* sp. nov."); Mt. Greylock, *A. L. Andrews* (listed as *B. triangularis* by the collector, RHODORA 6: 74. 1904); Everett Brook, Sheffield, *A. Lorenz*; Alandar, Berkshire County, *A. R. Northrop*. Connecticut: Salisbury, Beacon Falls,¹ Naugatuck, and Redding, *A. W. E.* (listed as *B. tricenata* by Evans & Nichols, Connecticut Geol. & Nat. Hist. Surv. 11: 64. 1908). General reports of the species from Massachusetts and Connecticut have been published by the writer, the last reference including also a general report from Maine (RHODORA 5: 171. 1903, as *B. triangularis*; 10: 190. 1908, and 15: 23. 1913, as *B. tricenata*).

Outside New England the following stations may be noted:—Newfoundland: Channel, *Howe & Lang*; Placentia Bay, *A. E. Waghorne* 21, 22. Nova Scotia: Louisburg, Cape Breton, *J. Macoun* 94, 108 (listed as *B. triangularis* by the collector, Cat. Canadian Pl. 7: 33. 1902); Port Clyde, *J. Macoun* 49; Purcell's Cove, Halifax Harbor, *Howe & Lang* 1542; near Indian Brook, mountains north of the Barrasois River, valley of the Barrasois, and Cape Dauphin, Cape Breton, *G. E. Nichols* 512, 592, 1141, 1322. New York, Catskill Mountains, *C. H. Peck* (listed as *Mastigobryum deflexum* by the collector, Ann. Rept. Reg. Univ. New York 19: 70. 1866); Rocky Falls, North Elba, Essex County, *C. H. Peck* 37 (listed as *B. deflexa* by the collector, Bull. New York State Mus. 6: 177. 1899); Little Falls, *C. F. Austin*; Clareyville, *C. H. Peck* 4; Chapel Pond Brook, Adirondack Mountains, *E. G. Britton*; Undercliff, Essex County, *C. C. Haynes* 338; Little Moose Lake, Herkimer County, *C. C. Haynes* (listed as *B. triangularis* by the collector, Bryologist

¹ A plant from this collection has been figured by the writer under the name *B. iricenata*, Ann. Bot. 26: 20. f. 27. 1912.

9: 62. 1906, and distributed as *B. tricrenata* [corrected label] in Am. Hep. 39); East River Falls, above Lake Colden, and Lake Mohonk, A. Lorenz. Virginia: summit of White Top, 5678 ft. alt., E. G. Britton 1, J. K. Small 52, 55, 56, 79 (listed as *B. deflexa* by Small & Vail, Mem. Torrey Club 4: 193. 1894). West Virginia: Tibbs Run, Monongalia County, C. F. Millspaugh (listed as *B. deflexa* by the collector in Prelim. Fl. West Virginia 496); road to Cheat View, E. M. Fling; Spruce, Pocohontas County, F. W. Gray 66. North Carolina: Grandfather Mountain, G. F. Atkinson 11579 (listed as *B. tricrenata* by Andrews, Bryologist 17: 60. 1914—the other specimens cited here are all referable to the same species in his opinion); Roan Mountain, 6000 ft. alt., A. L. Andrews 65.

Soon after the publication of this species in the Synopsis Hepaticarum, Lindenberg and Gottsche¹ redescribed and figured it, but subsequent writers, with few exceptions, have considered its claims for recognition unfounded. As early as 1856 Sullivant² expressed the opinion that *M. denudatum* was probably a form of *M. deflexum*, and Austin,³ in 1873, went one step farther by citing it as a simple synonym of *M. deflexum*. Most later students, especially in America, have followed Austin's examples. In 1888, however, Stephani⁴ reported *M. denudatum* from Miquelon Island, south of Newfoundland, basing his record on specimens collected by E. Delamare and designating the species as peculiar to America. Pearson⁵ cited this record two years later, under *Bazzania denudata*, but called attention to Austin's divergent views, and Macoun⁶ repeated Pearson's citation in his last publication on Canadian hepaticology. Apparently Stephani afterwards changed his mind regarding *B. denudata*, since he makes no mention of it whatever in his monograph of the genus *Mastigobryum*, published in 1908, not even including it among the synonyms of his *M. triangulare*. In all probability he placed it in the same category as the forma "*implexa*," to which allusion has already been made. The fact that Trevisan recognized the species by forming the combination "*Bazzania denudata*" does not mean that he actually studied it. He merely transferred all the species of *Mastigobryum*, as given in the Synopsis, to the genus *Bazzania*.

¹ Spec. Hepat. *Mastigobryum* 7. pl. 1, f. 1-4. 1851.

² In Gray, Man. Bot. Ed. 2, 702. 1856.

³ Hep. Bor.-Amer. 80. 1873.

⁴ In Delamare, Renauld & Cardot, Fl. Miquelonensis 66. 1888.

⁵ List Canadian Hepat. 9. 1890.

⁶ Cat. Canadian Pl. 7: 33. 1902.

In its variability *B. denudata* is a close rival of *B. tricrenata*. It is perhaps advisable, therefore, to base our conception of the species on vigorous specimens, since these may be assumed to approach the typical condition more closely than delicate and poorly developed specimens. Even in well-developed material the plants grow in depressed mats, the individual stems being prostrate or slightly ascending but apparently never approaching a suberect position. The younger portions and sometimes the entire plants are green or yellowish green and do not show the brownish pigmentation of the cell-walls, which constitutes so striking a feature of *B. tricrenata*. In the older portions a dull brownish hue occasionally becomes apparent, but this seems to be associated with age and death rather than with an active process of pigmentation.

The stems, so far as the living portions are concerned, are mostly 1-1.5 cm. long and measure (with the leaves) 1-2 mm. in width. At irregular intervals branches of the *Frullania* type, diverging at a wide angle, are produced; while flagelliform branches, arising in the axils of the underleaves, are rare or abundant according to circumstances. Occasionally a flagelliform branch gradually becomes transformed into a leafy branch as it increases in length, and a leafy branch may sometimes spring directly from the axil of an underleaf, showing that the distinction between leafy and flagelliform branches is by no means stable. Rhizoids are sparingly produced; in most cases they grow out from the basal cells of the reduced leaves on the flagelliform branches, but in very rare cases may take their origin from the basal cells of ordinary underleaves.

The leaves are distant to somewhat imbricate. They spread widely, usually at a right angle, and lie in approximately the same plane. In most cases the leaves are flat but they are sometimes more or less convex when viewed from above. They vary in form from short-ovate to oblong-ovate, measuring in most cases 0.6-0.8 mm. in length by 0.4-0.6 mm. in width, and are slightly or not at all falcate. The upper margin is more or less arched from a scarcely rounded base, while the lower margin tends to be more nearly straight, in rare cases showing a vague basal expansion. The apices are so variable that it is difficult to determine what represents the most typical condition. In some cases the leaf tapers gradually to an acute or obtuse point, but it is much more usual for the apex to be broad and rounded or truncate. Under these circumstances there

may be no signs of apical teeth, and a long series of intermediate conditions may sometimes be found, even on a single individual, between this extreme and a three-toothed apex with sharp teeth separated by obtuse sinuses. The three-toothed condition, however, is rarely realized, most plants showing only one or two teeth, and these may be blunt or otherwise indistinct rather than acute. The leaf-cells average about $27 \times 25 \mu$ in the middle of the leaf; their walls are thin; and their trigones are small and often indistinct, usually with straight or slightly concave sides. The cuticle seems to be smooth throughout.

The underleaves are almost as variable as the leaves. They are distant to approximate and may be slightly imbricate in the vicinity of the shoot-apices. Sometimes they are subappressed, but it is much more usual for them to spread more or less widely from the axis. On well-developed plants they usually measure 0.2–0.3 in length and 0.3–0.45 mm. in width, the shape being broadly quadrate-orbicular. The base is almost straight and shows no indications of auricles; while the straight or slightly bulging sides are usually entire, although vague crenations or sharper teeth may be present in rare instances. The broad and truncate apex may show four rounded or obtuse teeth separated by distinct sinuses. In most cases, however, the teeth are fewer or lacking altogether, the apex then being entire or slightly emarginate.

Although the perianths of *B. denudata* are still unknown, female branches with unfertilized archegonia are not infrequent. Branches of this character were detected by Gottsche, who described the involucreal leaves as ovate-cordate and crenulate at the apex with one or two teeth. Unfortunately the bracts and bracteoles of *B. tricrenata* and its allies do not attain their full size and development unless perianths and sporophytes are produced, so that Gottsche's account must not be accepted without reservations.

The most striking features of *B. denudata* are due to the production of caducous leaves and underleaves, and it is very unusual to find a patch of specimens in which this habit is not more or less in evidence. The throwing off of the leaves begins abruptly in most cases and then continues without interruption for a considerable period. Although in all probability the production of these leaves eventually brings the growth of the plant to an end, it is not unusual for an axis to fork two or three times after the caducous habit has been initiated.

Under such circumstances the forking and thread-like stems, tipped with rudimentary leaves but otherwise naked, except for the scanty vestiges left behind by the leaves and underleaves, present a very distinctive appearance. The caducous habit is sometimes more marked in the leaves than in the underleaves, and leafless stems with persistent underleaves are occasionally found. There are cases, too, where an axis recovers from the caducous habit and resumes its growth in a normal vegetative manner.

The caducous leaves are usually smaller than the ordinary leaves described above and may be reduced to a length of 0.2 mm. or even less, the caducous underleaves exhibiting a similar reduction in size. When a caducous leaf gives rise to a new stem the latter grows out directly, by a process of regeneration, from one of the leaf-cells, usually at or near the base. The stem elongates rapidly and produces a long series of minute leaves and underleaves, very similar to those on the flagelliform branches but somewhat firmer in texture and tending to spread more widely. Both leaves and underleaves are shortly bifid and essentially alike, the stem thus representing an almost radial structure and showing but little indication of the distinct dorsiventrality found in the normal leafy stems. The later stages in the development of these new stems have not been observed.

When typical plants of *B. tricrenata* and *B. denudata* are compared the differences between them are striking and have been brought out to a certain extent in the preceding account. In *B. tricrenata*, for example, the plants are more or less pigmented with brown, the stems tend to be suberect, the branches diverge at a narrow angle, and the persistent leaves are strongly convex; in *B. denudata*, on the contrary, the plants show no distinct brown pigmentation, the stems tend to be prostrate, the branches diverge at a wide angle, and the leaves are flat or only slightly convex and often caducous. When *B. denudata* is compared with "*Pleuroschisma tricrenatum* var. *implexum*" a closer approach is apparent, but in this latter plant the pigmentation is still present in a greater or less degree, the caducous habit is less marked and the caducous leaves themselves are less highly differentiated. It will be noted that "*Mastigobryum ambiguum* (in part)" is cited as one of the synonyms of *B. tricrenata*. This species was based on two specimens, as follows: "prov. Massachusetts (Asa Gray)" and "ad litora boreali-occidentalia (Hb. Hk.)." The first specimen has not been seen by the writer but there is little

doubt of its identity with *B. denudata*; the second specimen (according to a fragment in the Mitten Herbarium) represents a closely allied but apparently distinct species, widely distributed in the Pacific coast region from Alaska to Washington. This species, for which the specific name *ambiguum* may be retained, will be considered in another connection.

4. SCAPANIA NEMOROSA (L.) Dumort. Recueil d'Obs. sur les Jung.
14. 1835. *Jungermannia nemorosa* L. Sp. Plant. 1132. 1753. *Scapania nemorosa* is one of the commonest and most widely distributed of the leafy Hepaticae in Europe and North America. It is abundant in all the New England States, its range extending from the sea level to an altitude of five thousand feet or more. Although it attains its best development on moist rocks, it grows also on drier rocks, on banks in the woods, in swamps, and even on old logs; and it is not surprising that it occurs in numerous forms. Some of these are very different in appearance from one another, and yet it is difficult to distinguish them clearly on account of the existence of intermediate and intergrading forms. Within recent years, however, the attempt has been made to segregate out certain forms as distinct species. Of these segregates the following three occur in New England, and their claims for recognition may therefore be briefly considered: *S. Joergensenii* Schiffn., *S. Austinii* Warnst., and *S. recurvifolia* Warnst.

The first of these segregates, *S. Joergensenii*,¹ was based on material collected by the Norwegian botanist, E. Jörgensen, in the Blaamanden Mountains, near Bergen, Norway, at an altitude of 450–500 m. When Müller² published his monograph of the genus *Scapania* he gave a full description of *S. Joergensenii*, with illustrations, still citing the original material only and emphasizing the close relationship of the plant to *S. nemorosa*. He has since reduced it to varietal rank under *S. nemorosa* and has listed additional specimens from Alsace, Baden, Bohemia, the Fichtel and Harz Mountains of Germany, and the Thuringian Forest.³ He has noted its occurrence also in North America, without citing definite stations, but the writer is able to supply the following from the specimens in the Yale Herbarium: Mt. Clinton, Mt. Pleasant and Tuckerman's Ravine, White Moun-

¹ See Müller, Bull. Herb. Boiss. II. 1: 607. 1901.

² Nova Acta Acad. Caes. Leop. Carol. 83: 180. pl. 23. 1905.

³ Rabenhorst's Kryptogamen-Flora 62: 503. 1915.

tains, New Hampshire, *A. W. E.*; Crawford Bridle Path, White Mountains, *G. E. Nichols*. These stations are all near or above the timber line. As Müller points out the deep purple color is the only important feature distinguishing *S. Joergensenii* from *S. nemorosa*, and this feature by itself seems insufficient to justify a specific separation,

The second segregate, *S. Austinii*,¹ was based on No. 18 of Austin's Hep. Bor.-Amer., distributed as "*Scapania nemorosa*, var. 3" and described as very common "in shady places, on rocks and on the ground," no definite localities being cited. This specimen is referred to *S. nemorosa* without question by Müller, but Warnstorf criticises him for doing so and compares his *S. Austinii* with *S. curta* (Mart.) Dumort., rather than with *S. nemorosa*. The plant under consideration is frequent in southern New England, where it grows on shaded banks in woods, and at first sight looks very different from the typical form of *S. nemorosa* on moist rocks. It is characterized, according to its author, by its smaller size, by the small number of teeth on the leaf-lobes, and by the absence of wings on the keels. In the writer's opinion these features are associated with unfavorable environmental conditions and *S. Austinii* represents a juvenile condition of *S. nemorosa*, in which certain peculiarities of the species fail to manifest themselves. It may be added that inconspicuous keels are occasionally present and that the gemmae, which are abundantly produced, are yellow, pyriform or elliptical, and unicellular, thus agreeing with those of *S. nemorosa* rather than with those of *S. curta*. Warnstorf's species, therefore, should be regarded as a synonym of *S. nemorosa* or perhaps as a variety.

The third segregate, *S. recurvifolia*,² was based on another specimen distributed by Austin in his Hep.-Bor.-Amer. This specimen is No. 16 and was designated "*Scapania nemorosa* var. 1." It was described as common on the "margins of rivulets, swamps, &c.," and was likewise referred to *S. nemorosa* without question by Müller. Warnstorf admits the close relationship of his species to *S. nemorosa* but emphasizes, as differential characters, its recurved and entire dorsal leaf-lobes and its thin-walled leaf-cells with poorly developed trigones. Here again the distinctive features, even if they were constant, are very slight and appear to be associated in some way

¹ Hedwigia 63: 79. 1921.

² Hedwigia 63: 115. 1921.

with the environment. The writer, therefore, would regard *S. recurvifolia* as nothing more than a simple synonym of *S. nemorosa*. This conclusion is supported by the fact that the ventral leaf-lobes, as brought out by the description, are densely dentate and by the further fact that the gemmae are unicellular and conform closely to the *S. nemorosa* type.

In the same paper where Warnstorf described the last two segregates he reported the occurrence of the arctic *S. spitzbergensis* (Lindb.) K. Müll. in Connecticut, basing his record on a specimen collected by the writer at Branford. He intimated also that Müller's *S. nemorosa* forma *purpureolimbata*,¹ based primarily on a specimen collected by T. P. James at the Flume, New Hampshire, might be referable to the same species. The writer has examined these two specimens with care and finds that they lack the strongly convex dorsal lobes of *S. spitzbergensis* and also the coarsely toothed wings on the keels of the leaves; the keels in fact are almost invariably quite entire. There seems to be no reason, therefore, for separating these specimens from *S. nemorosa*, although they represent an unusually well-developed form. The only known American station for the true *S. spitzbergensis* is in Greenland.²

5. *LEJEUNEA PATENS* Lindb. Acta Soc. Sci. Fenn. 10: 482. 1875. On trees and wet rocks. Pemetic Mountain trail, 600 ft. alt., Green Mountain Gorge, 800 ft. alt., and Southwest Harbor, 90 ft. alt., Mt. Desert. Maine, July, 1921, A. Lorenz. New to New England. In 1902 the writer³ reported *L. patens* for the first time from North America, citing specimens from Newfoundland and Nova Scotia. It has since been collected in the mountains of North Carolina by Andrews.⁴ In Europe it is one of the so-called "Atlantic" species, its known range extending along the coast from Norway to Ireland. It is closely related to *L. cavifolia* (Ehrh.) Lindb., so closely in fact that Müller and others regard it as a "small" species. At the same time it can usually be distinguished without difficulty. It differs, for example, in its paler color; in its more convex leaf-blades, spreading more abruptly from the lobules; in its smaller and more nearly orbicular underleaves; and in the crenulate margins of its leaf-lobes and underleaves.

¹ Rabenhorst's Kryptogamen-Flora 6: 504. 1915.

² See Evans, Bryologist 14: 87. 1911.

³ Mem. Torrey Club 8: 160. 1902.

⁴ See Bryologist 24: 53. 1922.

The following additions to local state floras, not already mentioned in the preceding Notes, may be recorded:—

For Maine: *Riccia arvensis*, Belfast (A. Lorenz).

For Vermont: *Jungermannia cordifolia*, Hartland (A. Lorenz); *Scapania dentata*, Manchester (W. R. Taylor); *S. glaucocephala*, Pawlet (W. R. Taylor).

For Rhode Island: *Cephaloziella Hampeana* and *Lophozia Mildeana*, Westerly (A. Lorenz).

The census of New England Hepaticae now stands as follows: total number of species recorded, 196; number recorded from Maine, 151; from New Hampshire, 154, from Vermont, 137; from Massachusetts, 121; from Rhode Island, 81; from Connecticut, 146; from all six states, 66.

YALE UNIVERSITY.

THE NORTHERN VARIETY OF *GEUM VIRGINIANUM*.

M. L. FERNALD.

IN 1774 Johan Andreas Murray separated from *Geum virginianum* L. a Canadian plant which he described as *G. laciniatum*,¹ distinguishing it by its more lacinate basal leaves, more incised and smaller stipules and strictly glabrous fruits, the more southern *G. virginianum* having the fruits pilose (setose). The foliage- and stipule-characters emphasized by Murray seem to be of no special importance, but it is significant that the great bulk of northern plants of *G. virginianum* have quite glabrous carpels, while all the southern specimens have them bristly. This is clearly shown in the occurrence in New England and adjacent areas; all the specimens from northern, eastern and central Maine and northern New Hampshire have glabrous fruits, although this smooth-fruited plant extends very locally southward into the range of the bristly-fruited plant in eastern and extreme western Massachusetts. All material examined from the Mohawk Valley and from western New York and Ontario likewise has glabrous fruits.

On the other hand, all the more southern material seen, from Missouri, Illinois, Pennsylvania and Connecticut and nearly all from Massachusetts, southern New Hampshire and southwestern Maine,

¹ J. A. Murr. Comm. Novi. Gott. v. 30, t. 2 (1774).

has the fruits definitely setose. It is thus clear that as geographic varieties the two are well defined. They show no other characters and cannot be maintained as species, but since the specific name used by Murray would be endlessly misleading if transferred to the varietal category to designate a plant distinguished only by its naked fruit it is proposed to call the smooth-fruited extreme

GEUM VIRGIANUM L., var. **Murrayanum**, n. nom. *G. laciniatum* Murr. Comm. Novi. Gott. v. 30, t. 2 (1774).—The following specimens belong here. NOVA SCOTIA: Sunny Brae, Pictou Co., *St. John*, no. 1425; Five-mile River, Hants Co., *Pease & Long*, no. 21,518; Middleton, Annapolis Co., *Bissell & Linder*, no. 21,519. MAINE: Fort Fairfield, Aroostook Co., *Fernald*; Orono, Penobscot Co., *Scribner et al.*; Dover, Piscataquis Co., *Fernald*; Pembroke, Washington Co., *Fernald*, no. 1925; Frankfort, Waldo Co., *Fernald & Long*, no. 13,830; East Auburn, Androscoggin Co., *Merrill*, no. 277. NEW HAMPSHIRE: Columbia, Coös Co., *Pease*, no. 10,414; Lancaster, Coös Co., *Pease*, no. 17,105; Alstead, Cheshire Co., *Noyes & Fernald* no. 365. MASSACHUSETTS: Cambridge, Middlesex Co., *C. E. Perkins*; vicinity of Boston, *Biltmore Herb.* no. 4977a; Rehoboth, Bristol Co., *Forbes*; Dartmouth, Bristol Co., *Hervey*; South Worthington, Hampshire Co., *Robinson*, no. 805. NEW YORK: Utica, Oneida Co., *Haberer*, no. 249; Yorkville, Oneida Co., *Haberer*, no. 249; Caroline, Tompkins Co., *MacDaniels*, no. 4315; Ithaca, *Thomas*, no. 2619. ONTARIO: North Hastings, Northumberland Co., *J. Macoun*, no. 528.

GRAY HERBARIUM.

JOSSelyn BOTANICAL SOCIETY.—The annual field meeting of the Josselyn Botanical Society of Maine was held at the Lowrie camps, Eastbrook, July 11–14, 1922. Eighteen members were present.

The region is one of small ponds and dry heaths and consequently with a limited flora. Two hundred and six species were collected in Eastbrook, the most interesting being *Carex Houghtonii* growing on dry roadsides. Mr. J. H. Emerton made valuable notes, collections and photographs of spruce spiders, abundant in this locality.

One day was spent in Gouldsboro, resulting in the finding of *Pinus Banksiana* near its southern limit. Here also were *Mertensia maritima*, *Euphrasia Randii*, *E. americana*, *Iris setosa*, var. *canadensis*, *Rubus Chamaemorus*, *Arethusa bulbosa*, *Arceuthobium pusillum*, *Gaylussacia dumosa*, *Arenaria peploides*, *Carex exilis*, *Elymus mollis* and *Scirpus cespitosus*.

The twenty-eighth Annual Meeting will be held at Kingfield, Franklin Co., Maine, July 9th to 13th inclusive. Kingfield is reached by the Maine Central to Farmington, thence by the Sandy River and Rangeley Lakes Railroad.—LENA WILLIS, Secretary, Naples, Maine.

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Drawn by AMELIA BRACKETT.

GENTIANA VICTORINII, n. sp.

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